USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005NY66B

Title: GIS-based riparian buffer management optimization for phosphorous and sediment loading

Project Type: Research

Focus Categories: Nutrients, Sediments, Management and Planning

Keywords: GIS, phosphorus and sediment loading; riparian buffer management

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: $5,323

Non-Federal Matching Funds: $13,222

Congressional District: 26

Principal Investigator:
Paul L. Richards

Abstract

Buffering is a popular treatment and has been suggested for Black Creek Watershed. However it can be expensive and politically difficult to implement, particularly as much of the watershed is rural and still active agriculturally. Factors that need to be considered before implementing any management plan is the watershed's complex topography and land use which includes enormous areas of internally-drained topography, an extensive infrastructure of roads and connected imperviousness, and significant areas of low density urban development. These factors make it important to target best management practices in a cost-effective way and to develop a set of buffering management rules that consider downstream variation in topography, vegetation, surface flow paths and upgradient land cover. We propose that a simple set of buffering rules does not do justice to spatial heterogeneities in this and many other urbanizing watersheds in New York State, and that a combination of targeted best management practices in critical areas and a flexible buffer management scheme will reduce nonpoint source pollution in much more cost effective way. The authors of this proposal have developed a set of GIS-based modeling tools for identifying critical areas in the landscape that are easy to implement with available GIS data. We propose that these tools will better enable us to target structural best-management practices (BMP's) and design effective buffering strategies

that are considerably less restrictive to agriculture and other land uses. This research has a dual benefit: 1) to improve decision making in Black Creek watershed; and 2)to demonstrate the effectiveness of these tools so that they may be applied to other watersheds. In addition to reducing sediment-borne P fluxes in the agricultural portion of Black Creek, we believe this study will establish the utility of simple digital-terrain based sediment and phosphorous models for locating BMP's that will significantly reduce other kinds of particulate pollutants.